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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/823,935	PETERSON ET AL.	
	Examiner	Art Unit	
	Jin-Cheng Wang	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,14,20,21,23-32,42-48,86,88 and 91* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 14, 20-21, 23-32, 42-48, 86, 88 and 91* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's submission filed on 7/12/2007 has been entered. Claims 1, 14, 15, 41, 42, and 86 have been amended. Claims 7-13, 15-19, 22, 33-41, 49-85, 87, 89-90 and 92-97 have been canceled. Claims 1-6, 14, 20-21, 23-32, 42-48, 86, 88 and 91 are pending in the application.

Response to Arguments

Applicant's arguments, filed July 12, /2007 have been considered, but are moot in view of the new ground(s) of rejection set forth below.

With respect to the claim 1, Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Leather et al. U.S. Pat. No. 6,999,100 (hereinafter Leather).

As addressed below, Leather teaches in Fig. 9 a method for calculating values for pixels of an image, comprising:

Calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel, the sampling pattern for consecutive pixels alternating between a first and a second sampling pattern, wherein the calculation includes calculating a pair of sample values for pixels of an image in accordance with a sampling pattern for each pixel (*Leather teaches sampling patterns for adjacent pixels wherein the sampling patterns alternate between two different patterns for a plurality of pixels in an image and calculating three sample values for pixels of an image comprising the step of calculating less than three sample values for each pixel of an image, alternatively, calculating less than three sample values for each pixel by throwing out or filtering out one sample and thereby only two samples for each pixel are*

calculated; see Fig. 9); each sampling pattern defining one or more sampling locations at which sample values are calculated and the second sampling pattern corresponds to the first sampling pattern rotated 90 degrees (See Fig. 9), the sampling locations being relative to a pixel (*e.g., Leather Fig. 9*); and

Determining a value for at least one pixel by combining sample values calculated for the sampling locations for the pixel (*e.g., Leather Fig. 9*).

With respect to the claim 23, 27 and 91, Claims 23, 27 and 91 are rejected under 35 U.S.C. 102(e) as being anticipated by Deering U.S. Pat. No. 6,664,955 (hereinafter Deering).

As addressed below, Deering teaches a method for calculating values for pixels of an image having the pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, comprising:

Calculating sample values for pixels of the image in accordance with a plurality of sampling rates, the sampling rate defined by the number of samples per pixel and at least one sample per pixel, the sampling rate differing for at least two pixels of the image (*Deering discloses in Fig. 5A the variable sampling rates for pixels along the horizontal direction wherein the sampling rate differing for at least two pixels of the image. See also Fig. 23 wherein the first sampling pattern corresponds to the pattern for the interpolated pixels and the second sampling pattern corresponds to the pattern for the filtered pixels*); and

Calculating values for pixels of the image from respective calculated sample values (*see Deering Fig. 5A and 23; column 14, lines 64-67; column 15, lines 1-10*).

Applicant argues that claim 1-6 recite determining a value for at least one pixel of the image by combining the sample values and the value that is determined represents the useful result in producing the image. The examiner respectfully disagrees. The determining step as recited in the claim 1 is merely a mathematical calculation and the mere mathematical calculation does not produce useful and tangible results. There is no recitation that a useful and tangible result is produced after the mathematical calculations recited in the "calculating" step and the "determining" step set forth in the claim 1. See Benson, 409 U.S. 63, 175, USPQ 673 (finding machine-implemented method of converting binary coded decimal numbers into pure binary numbers unpatentable). See Schrader, 22 F.3d at 292-93, 30 USPQ2d at 1457-58. The Federal Circuit also recognizes that the fact that a nonstatutory method is carried out on a programmed computer does not make the process claim statutory. Gram, 888 F.2d at 841, 12 USPQ2d at 1829 (claim 16 ruled nonstatutory even though it was a computer-implemented process). See also State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02.

Applicant argues that it is well known that methods can be implemented in hardware such as programmable logic arrays and the like. However, the argument is irrelevant or invalid because no hardware or programmable logic array can be found as limitations in the claims. Moreover, as evidenced in lines 12-13 of Page 18, the present invention may be practiced using conventional software language.

Applicant also argues with respect to the claim 1 and similar claims regarding the 101 rejection set forth in the previous Office Action. However, claim 1 merely recites abstract ideas (instructions) in a method claim. Merely claiming nonfunctional descriptive material, i.e.,

abstract ideas, stored in a computer-readable medium, in a computer, on an electromagnetic carrier signal does not make it statutory. See Diehr, 450 U.S. at 185-86, 209 USPQ at 8.

Moreover the claim 1 does not produce a physical transformation or a useful and tangible result. Nowhere in the claim 1 recites a limitation that produces a useful and tangible result. The claimed steps of "calculating...calculating..." or "calculating...determining..." are purely mathematical calculations and do not produce a useful and tangible result, as opposed to displaying some kind of results. See State Street Bank & Trust Co. v. Signature Financial Group Inc. 149 F. 3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998) and AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 50 USPQ2d 1447 (Fed. Cir. 1999). These decisions explained that, to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1372-1374, 47 USPQ2d at 1601-02. Therefore, claim 1 is non-statutory for this reason.

With respect to the 112 rejection to the claim 42 and similar claims, applicant argues in essence that the embodiments in Fig. 5a or 5b can be combined with Fig. 8 or Fig. 9. The examiner respectfully disagrees with the applicant's argument. Different embodiments cannot be combined. Fig. 8 or Fig. 9 discloses an image having sampling patterns for pixels defined by four sampling locations. Fig. 5a or 5b discloses a different image having sampling patterns for pixels defined by two sampling locations. Applicant's claim 42 recites "calculating values for pixels of an image" wherein the image refers to the image in Fig. 5a. It cannot refer to both the image in Fig. 5a and a different image in Fig. 9. The image in Fig. 5a is different from the image in Fig. 9.

Applicant's claim 42 further recites "the sampling pattern having only two sample locations relative to a pixel". The pixel cannot refer to both the pixel in Fig. 5a and a different pixel in Fig. 9. The pixel in Fig. 5a is different from the pixel in Fig. 9.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-6, 14, 20-21, 23-32, 42-48, 86, 88 and 91 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-6, 14-32, 41-48:

Claim 1 recites "a method for calculating values for pixels of an image, comprising: calculating...; and determining..." Claim 1 is a computer program *per se*. Computer program per se is neither computer components nor statutory process. Thus, claim 1 is non-statutory.

Additionally, since claim 1 includes a 101 judicial exception, claim 1 must be for a practical application of the judicial exception. As is, claim 1 failed to recite either a physical transformation or produces a useful and tangible result. Thus, claim 1 is also non-statutory for this reason.

Claims 5-6, 14-32 and 41-48 are non-statutory for the same reasons discussed above.

Claims 86, 88 and 91:

Claim 86 applies a computer program as part of a seemingly patentable apparatus, however, claim 86 in reality seeks patent protection for the computer program. Computer program per se is neither computer components nor statutory process. Thus, claim 86 is non-statutory.

Additionally, since claim 86 includes a 101 judicial exception, claim 86 must be for a practical application of the judicial exception. As is, claim 86 failed to recite either a physical transformation or produces a useful and tangible result. Thus, claim 86 is also non-statutory for this reason.

Claims 88 and 91 are non-statutory for the same reasons discussed above.

Computer-Related Nonstatutory Subject Matter

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

Both types of "descriptive material" are nonstatutory when claimed as descriptive material per se. Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759. See Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

When nonfunctional descriptive material is recorded on some computer-readable medium, in a computer or on an electromagnetic carrier signal, it is not statutory since no requisite functionality is present to satisfy the practical application requirement. Merely claiming nonfunctional descriptive material, i.e., abstract ideas, stored in a computer-readable medium, in a computer, on an electromagnetic carrier signal does not make it statutory. See Diehr, 450 U.S. at 185-86, 209 USPQ at 8 (noting that the claims for an algorithm in Benson were unpatentable as abstract ideas because "[t]he sole practical application of the algorithm was in connection with the programming of a general purpose computer."). Such a result would exalt form over substance. In re Sarkar, 588 F.2d 1330, 1333, 200 USPQ 132, 137 (CCPA 1978) ("[E]ach invention must be evaluated as claimed; yet semantogenic considerations preclude a determination based solely on words appearing in the claims. In the final analysis under § 101, the claimed invention, as a whole, must be evaluated for what it is.") (quoted with approval in Abele, 684 F.2d at 907, 214 USPQ at 687). See also In re Johnson, 589 F.2d 1070, 1077, 200 USPQ 199, 206 (CCPA 1978) ("form of the claim is often an exercise in drafting"). Thus, nonstatutory music is not a computer component and it does not become statutory by merely recording it on a compact disk. Protection for this type of work is provided under the copyright law.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 42-48, 88 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

For example, the base claim 42 recites, "a pixel considered as divided evenly into **a four-by-four array** of sub-regions, the sampling pattern having only two sample locations relative to a pixel, each sample location located at one of four candidate sampling locations."

However, applicant's specification does not disclose selecting two sample locations from **four candidate sampling locations, with respect to the same image or a sampling pattern of a pixel in the same image**. See Figs. 5a or 5b wherein only two sample locations are selected from two candidate sampling locations, among a total of 16 sampling locations. There is no indication of four candidate sampling locations. The sampling pattern is relative to a pixel in the same Figure or the same embodiment and cannot be both relative to a pixel in Fig. 5a and another pixel in Fig. 9. The pixel in Fig. 5a is different from the pixel in Fig. 9. Different embodiments cannot be combined to construe the claim invention.

See also Figs. 8-9 wherein four sample locations are selected from the four candidate locations or four sample locations are selected from the 4 by 4 subpixels for each pixel. There is

no indication of *less than three sample locations*. Figs 5a and 5b represent different embodiments of sampling pattern than those of Figs. 8-9 and cannot possibly be combined.

Fig. 8 or Fig. 9 discloses an image having sampling patterns for pixels defined by four sampling locations. Fig. 5a or 5b discloses a different image having sampling patterns for pixels defined by two sampling locations. Applicant's claim 42 recites "calculating values for pixels of an image" wherein the image refers to the image in Fig. 5a. It cannot refer to both the image in Fig. 5a and a different image in Fig. 9. The image in Fig. 5a is different from the image in Fig. 9. Applicant's claim 42 further recites "the sampling pattern having only two sample locations relative to a pixel". The pixel cannot refer to both the pixel in Fig. 5a and a different pixel in Fig. 9. The pixel in Fig. 5a is different from the pixel in Fig. 9.

Therefore, these claim limitations set forth in the claim 42 are not described in the specification in such a way that as to reasonably convey to one of the ordinary skill in art had possession of the claimed invention.

To comply with the "written description" requirement of 35 U.S.C. 112, first paragraph, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filling date sought, he or she was in possession of the invention. The invention is, for purposes of the "written description" inquiry, whatever is now claimed. Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). For purposes of written description, one shows "possession" by descriptive means such as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). Such descriptive means cannot be found in the disclosure for the inventions of the base claim 41.

The claims 43-48 depend upon the claim 42 and are rejected due to their dependency on the claim 42.

The claim 88 depends upon the claim 86 while the base claim 86 is amended to recite, "sampling at only two sample locations relative to a pixel" and the claim 88 recites "a sampling pattern is considered as dividing a given pixel into a four-by-four array of sub-pixels" and "four potential sampling positions".

However, **applicant's specification does not describe a combination of these limitations in a single embodiment**. Therefore, these claim limitations set forth in the claim 88 are not described in the specification in such a way that as to reasonably convey to one of the ordinary skill in art had possession of the claimed invention.

To comply with the "written description" requirement of 35 U.S.C. 112, first paragraph, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filling date sought, he or she was in possession of the invention. The invention is, for purposes of the "written description" inquiry, whatever is now claimed. Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). For purposes of written description, one shows "possession" by descriptive means such as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). Such descriptive means cannot be found in the disclosure for the inventions of the base claim 88.

Due to the 112 rejection to the claims set forth in above, the prior art rejection of the claims 41-48 and 88 are based on the claim limitations best understood by the Examiner.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Leather et al. U.S. Pat. No. 6,999,100 (hereinafter Leather).

Claim 1:

Leather teaches in Fig. 9 a method for calculating values for pixels of an image, comprising:

Calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel, the sampling pattern for consecutive pixels alternating between a first and a second sampling pattern, wherein the calculation includes calculating a pair of sample values for pixels of an image in accordance with a sampling pattern for each pixel (*Leather teaches sampling patterns for adjacent pixels wherein the sampling patterns alternate between two different patterns for a plurality of pixels in an image and calculating three sample values for pixels of an image* *comprising the step of calculating less than three sample values for each pixel of an image, alternatively, calculating less than three sample values for each pixel by throwing out or filtering out one sample and thereby only two samples for each pixel are*

calculated; see Fig. 9); each sampling pattern defining one or more sampling locations at which sample values are calculated and the second sampling pattern corresponds to the first sampling pattern rotated 90 degrees (See Fig. 9), the sampling locations being relative to a pixel (*e.g., Leather Fig. 9*); and

Determining a value for at least one pixel by combining sample values calculated for the sampling locations for the pixel (*e.g., Leather Fig. 9*).

Claims 23-32 and 91 are rejected under 35 U.S.C. 102(e) as being anticipated by Deering U.S. Pat. No. 6,664,955 (hereinafter Deering).

Claim 23:

Deering teaches a method for calculating values for pixels of an image having the pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, comprising:

Calculating sample values for pixels of the image in accordance with a plurality of sampling rates, the sampling rate defined by the number of samples per pixel and at least one sample per pixel, the sampling rate differing for at least two pixels of the image (*Deering discloses in Fig. 5A the variable sampling rates for pixels along the horizontal direction wherein the sampling rate differing for at least two pixels of the image. See also Fig. 23 wherein the first sampling pattern corresponds to the pattern for the interpolated pixels and the second sampling pattern corresponds to the pattern for the filtered pixels*); and

Calculating values for pixels of the image from respective calculated sample values (*see Deering Fig. 5A and 23; column 14, lines 64-67; column 15, lines 1-10*).

Claim 24:

The claim 24 encompasses the same scope of invention as that of claim 23 except additional claimed limitation of the sampling rate alternating per pixel for consecutive pixels along lines parallel to one or the other axes of the image for at least some of the horizontal or vertical lines of pixels of the image.

However, Deering further discloses the claimed limitation of the sampling rate alternating per pixel for consecutive pixels along lines parallel to one or the other axes of the image for at least some of the horizontal or vertical lines of pixels of the image (*see Deering Fig. 5A and 23; column 14, lines 64-67; column 15, lines 1-10*).

Claim 25:

The claim 25 encompasses the same scope of invention as that of claim 23 except additional claimed limitation of the sampling rate being constant for the pixels arranged along any given line parallel to the first axis and varies among the plurality of sampling rates for the pixels arranged along any given line parallel to the second axis.

However, Deering further discloses the claimed limitation of the sampling rate being constant for the pixels arranged along any given line parallel to the first axis and varies among the plurality of sampling rates for the pixels arranged along any given line parallel to the second axis (*see Deering Fig. 5A and 23; column 14, lines 64-67; column 15, lines 1-10*).

Claim 26:

The claim 26 encompasses the same scope of invention as that of claim 25 except additional claimed limitation of the first and second sampling rates alternating per pixel for consecutive pixels in any line parallel to the second axis.

However, Deering further discloses the claimed limitation of the first and second sampling rates alternating per pixel for consecutive pixels in any line parallel to the second axis (*see Deering Fig. 5A and 23; column 14, lines 64-67; column 15, lines 1-10*).

Claim 27:

Deering teaches a method for calculating values for pixels of an image having the pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, comprising:

Calculating sample values for pixels of the image in accordance with first and second sampling rates, the sampling rate defined by the number of samples per pixel and at least one sample per pixel, the sampling rate remaining constant for consecutive pixels arranged along any one given line parallel to the first axis and varying between the first and second sampling rates for consecutive pixels arranged along any one given line parallel to the second axis (*Deering discloses in Fig. 5A the variable sampling rates for pixels along the horizontal direction wherein the sampling rate differing for at least two pixels of the image. See also Fig. 23 wherein the first sampling pattern corresponds to the pattern for the interpolated pixels and the second sampling pattern corresponds to the pattern for the filtered pixels*); and

Calculating values for pixels of the image from a respective calculated sample values (*see Deering Fig. 5A and 23; column 14, lines 64-67; column 15, lines 1-10*).

Claim 28:

The claim 28 encompasses the same scope of invention as that of claim 27 except additional claimed limitation of the pixels of the image being arranged in rows parallel to the first axis and columns parallel to the second axis, and the first and second sampling rates alternating every row of pixels. However, Deering further discloses the claimed limitation of the pixels of the image being arranged in rows parallel to the first axis and columns parallel to the second axis, and the first and second sampling rates alternating every row of pixels (*Deering discloses in Fig. 5A the variable sampling rates for pixels along the horizontal direction wherein the sampling rate differing for at least two pixels of the image. See also Fig. 23 wherein the first sampling pattern corresponds to the pattern for the interpolated pixels and the second sampling pattern corresponds to the pattern for the filtered pixels*).

Re Claim 29:

Deering further discloses in Fig. 5A and Fig. 23 that the first sampling rate is two samples per pixel and the second sampling rate is one sample per pixel.

Re Claim 30:

Deering further discloses in Fig. 5A and Fig. 23 the first sampling rate is two samples per pixel and the second sampling rate is one sample per pixel, the two sample locations per pixel for the first sampling rate arranged within a pixel along a line forming an acute angle with respect to either the first or second axes.

Re Claim 31:

Deering further discloses in Fig. 5A and Fig. 23 that the first sampling rate is two samples per pixel and the second sampling rate is one sample per pixel, the two samples per

pixel for the first sampling rate arranged within a pixel substantially along and on opposite sides of a line parallel to either the first or second axes that divides the pixel in two, the axis to which the line is parallel alternating per consecutive pixel arranged along a line parallel to the first axis.

Re Claim 32:

Deering further discloses in Fig. 5A that the two samples per pixel of the first sampling rate vary for every other consecutive pixel lying along a line parallel to the first axis between a given sampling pattern and another sampling pattern which is substantially the same pattern rotated 90 degrees.

Claim 91:

The claim 91 encompasses the same scope of invention as set forth in claim 27 except additional claimed limitation of an apparatus for rendering of an image. However, Deering further discloses the claimed limitation of an apparatus for rendering of an image (*see Figs. 5A and 23*).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 42-48 are rejected under 35 U.S.C. 102(e) as being anticipated by Sato et al. U.S. Pat. No. 6,731,301 (hereinafter Sato).

Claim 42:

Sato teaches a method for calculating values for pixels of an image having its pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, comprising:

Calculating sample values for pixels of the image in accordance with one or more sample patterns (*e.g., the sample patterns are different because the sampling locations are different from pixels in the same row. The sampling patterns are different because the sampling rates are different from pixels in the same column. Fig. 31 of Sato discloses one sample pattern, Fig. 32 discloses another sample pattern and Fig. 35 discloses two sample patterns*), the region of potential sampling locations relative to a pixel considered as divided evenly into a four-by-four array of sub-regions each sampling pattern having less than three sample locations relative to a pixel (*e.g., at column 12, lines 49-53 and column 13, lines 25-35, Sato teaches 4 × 4 stamp by super sampling P × P subpixels per one stamp of 4×4 subpixels with $P = 2^n$. For n = 0, the 1 ×1 super sampling only samples one subpixel per stamp of 4 × 4 subpixels. At column 13, lines 25-53 and column 14, lines 28-35, Sato teaches P × P sparse sampling while the stamp is composed of M × N subpixels and thus disclosing 1 × 1 sparse sampling in a stamp of 4 × 4 subpixels. Sato further discloses selecting several points from the samples and thus disclosing selecting less than three sample locations relative to a pixel. See column 15, lines 30-37 wherein the number of subpixels in the stamp exceeds the number of sampling subpixels for the case N > P. Thus, the claim limitation of calculating less than three sample values for a pixel is taught by Sato in any*

of these contexts), each sample location located at one of four candidate sampling locations, and the candidate sampling locations arranged in a manner whereby no two of the four candidate sample locations for a given sampling pattern are located along the same row, column, or diagonal of sub-regions, at least one sampling pattern including at least one other sampling location not located in one of the candidate sampling locations, no more than seven sub-regions containing any sampling location (see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14); and

Calculating values for pixels of the image from sample values calculated from respective pixels (*see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Sato implicitly teaches the claim limitation, "the sampling pattern having less than three sample locations relative to a pixel" within "calculating sample values for pixels of the image in accordance with a sampling pattern, the region of potential sampling locations relative to a pixel considered as divided evenly into a four-by-four array of sub-regions, the sampling pattern having less than three sample locations relative to a pixel, each sample location located at one of four candidate sampling locations."

Sato teaches calculating four sample values for pixels of an image in accordance with a sampling pattern for each pixel comprising calculating one sample value, two sample values in a loop of actions. Moreover, Sato teaches that four samples are available for calculation. This does not mean all four samples have to be always calculated. Sato may only have to calculate less than four sample values. Therefore, Sato implicitly teaches the claim limitation of "calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel. Sato has four samples for each pixel and Sato's calculation comprises calculating the first

sample for each pixel, followed by calculating the second sample for each pixel and stop there without calculating the remaining sample values, or calculating the remaining samples at a later time.

Moreover, samples are calculated on a one-by-one basis either consecutively or pair-wise simultaneously, in whatever manner. Sato does not have to calculate all four samples even though all four samples are available for a pixel. Applicant's claim limitation does not recite "calculating only two sample values for each pixel wherein each pixel only has two samples". The claim limitation of "calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel" set forth in the claim 1 is subject to the broadest interpretation consistent with applicant's specification.

During patent examination, the claims are given the broadest reasonable interpretation consistent with the specification. See In re Morris, 127 F.3d 1048, 44 USPQ2d 1023 (Fed. Cir. 1997). See MPEP § 2111 - § 2116.01, for case law pertinent to claim analysis. Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) (claims must be interpreted "in view of the specification" without importing limitations from the specification into the claims unnecessarily). In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow.... The reason is simply that during patent prosecution when

claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed.... An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process."). A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

Therefore, in view of Sato, having four samples available, Sato can choose any of the samples for the calculation of a value for the pixel, including calculating less than three samples for a pixel. Thus, the claim limitation of calculating less than three sample values for a pixel is taught by Sato.

Moreover, at column 12, lines 49-53 and column 13, lines 25-35, Sato teaches 4 × 4 stamp by super sampling P × P subpixels per one stamp of 4×4 subpixels with $P = 2^n$. For n = 0, the 1 ×1 super sampling only samples one subpixel per stamp of 4 × 4 subpixels. At column 13, lines 25-53 and column 14, lines 28-35, Sato teaches P × P sparse sampling while the stamp is composed of M × N subpixels and thus disclosing 1 × 1 sparse sampling in a stamp of 4 × 4 subpixels. Sato further discloses selecting several points from the samples and thus disclosing selecting and calculating less than three sample locations relative to a pixel. See column 15, lines 30-37, wherein the number of subpixels in the stamp exceeds the number of sampling subpixels

for the case N > P. Thus, the claim limitation of calculating less than three sample values for a pixel is taught in many different contexts by Sato.

Claim 43:

The claim 43 encompasses the same scope of invention as that of claim 42 except additional claimed limitation of the two sample locations located in the first and fourth rows of the array of sub-regions.

However, Sato further discloses the claimed limitation of the two sample locations located in the first and fourth rows of the array of sub-regions (*see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 44:

The claim 44 encompasses the same scope of invention as that of claim 43 except additional claimed limitation of the two sample locations located substantially at the center of respective sub-regions. However, Sato further discloses the claimed limitation of the two sample locations located substantially at the center of respective sub-regions (*e.g., each sub-pixel sample area forms a sub-region and therefore each sampling location lies at the center of a sub-region; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 45:

The claim 45 encompasses the same scope of invention as that of claim 43 except additional claimed limitation of the two sample locations located at the center of respective sub-regions. However, Sato further discloses the claimed limitation of the two sample locations

located at the center of respective sub-regions (*e.g., each sub-pixel sample area forms a sub-region and therefore each sampling location lies at the center of a sub-region; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 46:

The claim 46 encompasses the same scope of invention as that of claim 42 except additional claimed limitation of the two sample locations located in the second and third rows of the array of sub-regions. However, Sato further discloses the claimed limitation of the two sample locations located in the second and third rows of the array of sub-regions (*see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 47:

The claim 47 encompasses the same scope of invention as that of claim 446 except additional claimed limitation of the two sample locations located substantially at the center of respective sub-regions. However, Sato further discloses the claimed limitation of the two sample locations located substantially at the center of respective sub-regions (*e.g., each sub-pixel sample area forms a sub-region and therefore each sampling location lies at the center of a sub-region; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 48:

The claim 48 encompasses the same scope of invention as that of claim 46 except additional claimed limitation of the two sample locations located at the center of respective sub-regions. However, Sato further discloses the claimed limitation of the two sample locations located at the center of respective sub-regions (*e.g., each sub-pixel sample area forms a sub-*

region and therefore each sampling location lies at the center of a sub-region; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14).

Claim Rejections - 35 USC § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 103 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6, 14, 20-21, 32, 86 and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. U.S. Pat. No. 6,731,301 (hereinafter Sato) in view of Leather et al. U.S. Pat. No. 6,999,100 (hereinafter Leather).

Claim 1:

(1) Sato teaches a method for calculating values for pixels of an image, comprising:

Calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel, the sampling pattern for consecutive pixels alternating between a first and a second sampling pattern, wherein the calculation includes calculating a pair of sample values for pixels of an image in accordance with a sampling pattern for each pixel (*Sato teaches*

sampling patterns for adjacent pixels wherein the sampling patterns alternate between two different patterns selected from the pattern table for a plurality of pixels in an image and calculating four sample values for pixels of an image comprising calculating less than three sample values for pixels of an image; see Figs. 26, 29, 34, 36, and 38); each sampling pattern defining one or more sampling locations at which sample values are calculated, the sampling locations being relative to a pixel (*e.g., Sato teaches each sampling pattern having sample locations arranged within a 4 by 4 sub-pixel matrix relative to a pixel; Figs. 24-38; col. 2, 4, 8, 11-12; 13-14*); and

Determining a value for at least one pixel by combining sample values calculated for the sampling locations for the pixel (*e.g., Sato teaches determining the pixel values from the sample locations to avoid anti-aliasing effect; Figs. 24-38; col. 2, 4, 8-10, 11-12; 13-14*).

Sato teaches calculating four sample values for pixels of an image in accordance with a sampling pattern for each pixel comprising calculating one sample value, two sample values in a loop of actions. Moreover, Sato teaches that four samples are available for calculation. This does not mean all four samples have to be always calculated. Sato may only have to calculate less than four sample values. Therefore, Sato implicitly teaches the claim limitation of "calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel. Sato has four samples for each pixel and Sato's calculation comprises calculating the first sample for each pixel, followed by calculating the second sample for each pixel and stop there without calculating the remaining sample values, or calculating the remaining samples at a later time.

Moreover, samples are calculated on a one-by-one basis either consecutively or pair-wise simultaneously, in whatever manner. Sato does not have to calculate all four samples even though all four samples are available for a pixel. Applicant's claim limitation does not recite "calculating only two sample values for each pixel wherein each pixel only has two samples". The claim limitation of "calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel" set forth in the claim 1 is subject to the broadest interpretation consistent with applicant's specification.

During patent examination, the claims are given the broadest reasonable interpretation consistent with the specification. See In re Morris, 127 F.3d 1048, 44 USPQ2d 1023 (Fed. Cir. 1997). See MPEP § 2111 - § 2116.01, for case law pertinent to claim analysis. Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) (claims must be interpreted "in view of the specification" without importing limitations from the specification into the claims unnecessarily). In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow.... The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed.... An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of

claim scope be removed, as much as possible, during the administrative process."). A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

Therefore, in view of Sato, having four samples available, Sato can choose any of the samples for the calculation of a value for the pixel, including calculating less than three samples for a pixel. Thus, the claim limitation of calculating less than three sample values for a pixel is taught by Sato.

Moreover, at column 12, lines 49-53 and column 13, lines 25-35, Sato teaches 4 × 4 stamp by super sampling P × P subpixels per one stamp of 4×4 subpixels with $P = 2^n$. For n = 0, the 1 ×1 super sampling only samples one subpixel per stamp of 4 × 4 subpixels. At column 13, lines 25-53 and column 14, lines 28-35, Sato teaches P × P sparse sampling while the stamp is composed of M × N subpixels and thus disclosing 1 × 1 sparse sampling in a stamp of 4 × 4 subpixels. Sato further discloses selecting several points from the samples and thus disclosing selecting and calculating less than three sample locations relative to a pixel. See column 15, lines 30-37, wherein the number of subpixels in the stamp exceeds the number of sampling subpixels for the case N > P. Thus, the claim limitation of calculating less than three sample values for a pixel is taught in many different contexts by Sato.

However, Sato is silent to the claim limitation that the second sampling pattern corresponds to the first sampling pattern rotated 90 degrees. Sato further discloses the claimed

limitation of each of the two sampling patterns being applied to every other pixel along at least one row or column of pixels, the second sampling pattern substantially corresponding to the first sampling pattern rotated 90 degrees (*Sato discloses selecting sampling pattern from a plurality of sampling patterns from the pattern table at the predetermined condition. Sato further teaches rotating the sampling locations 180 degree. An alternative sampling pattern with sample positions rotated 90 degree from the sampling pattern of the last pixel can be selected for the present pixel from the pattern table; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8-10, 11-12; 13-14*).

Leather teaches the claim limitation.

It would have been obvious to have combined Leather and Sato. Sato teaches or suggests the claim limitation that the second sampling pattern corresponds to the first sampling pattern rotated 90 degrees.

Leather teaches in column 14 that programmer can set the subsample locations by writing global registers and super-sample locations may be specified as x and y distance from the pixel quad center. Thus sampling patterns are programmable and this allows any sampling patterns can be set by the programmer with respect to the consecutive pixels. Leather thus teaches or suggests the claim limitations.

Moreover, Leather teaches in Fig. 9 a method for calculating values for pixels of an image, comprising:

Calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel, the sampling pattern for consecutive pixels alternating between a first and a second sampling pattern, wherein the calculation includes calculating a pair of sample

values for pixels of an image in accordance with a sampling pattern for each pixel (*Leather teaches sampling patterns for adjacent pixels wherein the sampling patterns alternate between two different patterns for a plurality of pixels in an image and calculating three sample values for pixels of an image comprising the step of calculating less than three sample values for each pixel of an image, alternatively, calculating less than three sample values for each pixel by throwing out or filtering out one sample and thereby only two samples for each pixel are calculated; see Fig. 9*); each sampling pattern defining one or more sampling locations at which sample values are calculated and the second sampling pattern corresponds to the first sampling pattern rotated 90 degrees (See Fig. 9), the sampling locations being relative to a pixel (*e.g., Leather Fig. 9*); and

Determining a value for at least one pixel by combining sample values calculated for the sampling locations for the pixel (*e.g., Leather Fig. 9*).

One of the ordinary skill in the art would have been motivated to do so to provide alternating sampling patterns for consecutive pixels (Leather Fig. 9).

Claim 2:

The claim 2 encompasses the same scope of invention as that of claim 1 except additional claimed limitation that each sampling pattern defines two sample locations and calculating sample values comprises calculating a pair of sample values whenever sample values for a pixel are calculated in accordance with the first or second sampling pattern, the sampling patterns alternating from one pixel to the next.

However, Sato further discloses the claimed limitation that each sampling pattern defines two sample locations and calculating sample values comprises calculating a pair of sample

values whenever sample values for a pixel are calculated in accordance with the first or second sampling pattern, the sampling patterns alternating from one pixel to the next (*at least two sampling locations are defined and calculated for each sampling pattern in accordance with the first or second sampling pattern; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 3:

The claim 3 encompasses the same scope of invention as that of claim 2 except additional claimed limitation that the pixels of the image are arranged along rows and columns parallel to first and second perpendicular axes, respectively, and the pair of sample locations per sampling pattern for at least two pixels are arranged along a line parallel to neither axis.

However, Sato further discloses the claimed limitation that the pixels of the image are arranged along rows and columns parallel to first and second perpendicular axes, respectively, and the pair of sample locations per sampling pattern for at least two pixels are arranged along a line parallel to neither axis (*e.g., the horizontal and vertical axes are in parallel with the rows and columns of the pixels and a diagonal line of the 4 by sub-pixel matrix; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 4:

The claim 4 encompasses the same scope of invention as that of claim 2 except additional claimed limitation of calculating a pair of sample values comprises calculating sample values at sample positions arranged according to either a first or second sample pattern, the first sampling pattern having sample positions on opposite sides of a line parallel to a first axis and dividing a respective pixel region in two, and the second sampling pattern having sample positions on

opposite sides of a line parallel to a second axis and dividing a respective pixel region in two, the second axis perpendicular to the first axis.

However, Sato further discloses the claimed limitation that calculating sample values at sample positions arranged according to either a first or second sample pattern, the first sampling pattern having sample positions on opposite sides of a line parallel to a first axis and dividing a respective pixel region in two, and the second sampling pattern having sample positions on opposite sides of a line parallel to a second axis and dividing a respective pixel region in two, the second axis perpendicular to the first axis (*the first axis is the x-axis and the second axis is the y-axis. Samples are distributed on the two regions separated by the middle line of the 4 by 4 sub-pixel matrix parallel to the x-axis and the middle line. Samples are also distributed on the two regions separated by the middle line of the 4 by 4 sub-pixel matrix parallel to the y-axis; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 5:

The claim 5 encompasses the same scope of invention as that of claim 4 except additional claimed limitation of the two lines parallel to the respective axes pass through the centers of respective pixels. However, Sato further discloses the claimed limitation that the pixels of the two lines parallel to the respective axes pass through the centers of respective pixels (*the first axis is the x-axis and the second axis is the y-axis. Samples are distributed on the two regions separated by the middle line of the 4 by 4 sub-pixel matrix parallel to the x-axis and the middle line. Samples are also distributed on the two regions separated by the middle line of the 4 by 4 sub-pixel matrix parallel to the y-axis; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 6:

The claim 6 encompasses the same scope of invention as that of claim 5 except additional claimed limitation that each sampling pattern has a sample position on each side of both of two lines parallel to respective axes and passing through the center of respective pixels.

However, Sato further discloses the claimed limitation that each sampling pattern has a sample position on each side of both of two lines parallel to respective axes and passing through the center of respective pixels (*the first axis is the x-axis and the second axis is the y-axis. Samples are distributed on the two regions separated by the middle line of the 4 by 4 sub-pixel matrix parallel to the x-axis and the middle line. Samples are also distributed on the two regions separated by the middle line of the 4 by 4 sub-pixel matrix parallel to the y-axis; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 14:

Sato teaches a method for generating an image having pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, comprising:

Calculating two sample values less than three sample values for pixels of the image in accordance with a plurality of sampling patterns, one sampling pattern per pixel, one pair of sampling points per sampling pattern, a first sampling pattern defines sample positions relative to a given pixel on opposite sides of a line parallel to a first axis of the image and dividing the respective pixel in two, and a second sampling pattern defines sample positions relative to a given pixel on opposite sides of a line parallel to a second axis of the image and dividing the respective pixels in two (*Sato discloses calculating pairs of sample values for pixels in*

accordance to the at least two different sampling patterns see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14); and

Calculating a value for at least one pixel of the image from a respective pair or pairs of calculated sample values (*Sato discloses determining the pixel values from the four sample locations for each pixel* see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14).

Sato teaches calculating four sample values for pixels of an image in accordance with a sampling pattern for each pixel comprising calculating one sample value, two sample values in a loop of actions. Moreover, Sato teaches that four samples are available for calculation. This does not mean all four samples have to be always calculated. Sato may only have to calculate less than four sample values. Therefore, Sato implicitly teaches the claim limitation of "calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel. Sato has four samples for each pixel and Sato's calculation comprises calculating the first sample for each pixel, followed by calculating the second sample for each pixel and stop there without calculating the remaining sample values, or calculating the remaining samples at a later time.

Moreover, samples are calculated on a one-by-one basis either consecutively or pair-wise simultaneously, in whatever manner. Sato does not have to calculate all four samples even though all four samples are available for a pixel. Applicant's claim limitation does not recite "calculating only two sample values for each pixel wherein each pixel only has two samples". The claim limitation of "calculating less than three sample values for pixels of an image in accordance with a sampling pattern for each pixel" set forth in the claim 1 is subject to the broadest interpretation consistent with applicant's specification.

During patent examination, the claims are given the broadest reasonable interpretation consistent with the specification. See In re Morris, 127 F.3d 1048, 44 USPQ2d 1023 (Fed. Cir. 1997). See MPEP § 2111 - § 2116.01, for case law pertinent to claim analysis. Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) (claims must be interpreted "in view of the specification" without importing limitations from the specification into the claims unnecessarily). In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow.... The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed.... An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process."). A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

Therefore, in view of Sato, having four samples available, Sato can choose any of the samples for the calculation of a value for the pixel, including calculating less than three samples for a pixel. Thus, the claim limitation of calculating less than three sample values for a pixel is taught by Sato.

Moreover, at column 12, lines 49-53 and column 13, lines 25-35, Sato teaches 4 × 4 stamp by super sampling P × P subpixels per one stamp of 4×4 subpixels with $P = 2^n$. For n = 0, the 1 ×1 super sampling only samples one subpixel per stamp of 4 × 4 subpixels. At column 13, lines 25-53 and column 14, lines 28-35, Sato teaches P × P sparse sampling while the stamp is composed of M × N subpixels and thus disclosing 1 × 1 sparse sampling in a stamp of 4 × 4 subpixels. Sato further discloses selecting several points from the samples and thus disclosing selecting and calculating less than three sample locations relative to a pixel. See column 15, lines 30-37, wherein the number of subpixels in the stamp exceeds the number of sampling subpixels for the case N > P. Thus, the claim limitation of calculating less than three sample values for a pixel is taught in many different contexts by Sato.

Sato is silent to the claim limitation that the second sampling pattern substantially corresponding to the first sampling pattern rotated 90 degrees. Sato further discloses the claimed limitation of each of the two sampling patterns being applied to every other pixel along at least one row or column of pixels, the second sampling pattern substantially corresponding to the first sampling pattern rotated 90 degrees (*Sato discloses selecting sampling pattern from a plurality of sampling patterns from the pattern table at the predetermined condition. Sato further teaches rotating the sampling locations 180 degree. An alternative sampling pattern with sample positions rotated 90 degree from the sampling pattern of the last pixel can be selected for the*

present pixel from the pattern table; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8-10, 11-12; 13-14).

Leather teaches in column 14 that programmer can set the subsample locations by writing global registers and super-sample locations may be specified as x and y distance from the pixel quad center. Thus sampling patterns are programmable and this allows any sampling patterns can be set by the programmer with respect to the consecutive pixels. Leather thus teaches or suggests the claim limitations.

Leather teaches in Figs. 9 and 14 a method for generating an image having pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, comprising:

Calculating two sample values less than three sample values for pixels of the image in accordance with a plurality of sampling patterns, one sampling pattern per pixel, one pair of sampling points per sampling pattern (*e.g., Leather teaches filtering includes filtering one sample value and calculating two sample values and thus one sampling pattern per pixel and one pair of sampling points per sampling pattern are calculated*), a first sampling pattern defines sample positions relative to a given pixel on opposite sides of a line parallel to a first axis of the image and dividing the respective pixel in two, and a second sampling pattern defines sample positions relative to a given pixel on opposite sides of a line parallel to a second axis of the image and dividing the respective pixels in two (*Leather teaches sampling patterns for adjacent pixels wherein the sampling patterns alternate between two different patterns selected from the pattern table for a plurality of pixels in an image and calculating three sample values for pixels of an image comprising the step of calculating less than three sample values for pixels of an*

image, alternatively by throwing out or filtering out one sample, only two samples for each pixel are calculated; see Fig. 9); and

Calculating a value for at least one pixel of the image from a respective pair or pairs of calculated sample values (*e.g., Leather Fig. 9*).

One of the ordinary skill in the art would have been motivated to do so to provide alternating sampling patterns for consecutive pixels (Leather Fig. 9).

Claim 20:

The claim 20 encompasses the same scope of invention as that of claim 14 except additional claimed limitation that all sampling patterns are considered as dividing the regions of respective pixels into the same four-by-four array of sub-regions and four potential sample positions are arranged within the array in a manner whereby no two potential sample positions are located in the same row, column, or diagonal of sub-regions, the plurality of sampling patterns comprising first and second sampling patterns, each defining two sampling positions from the four potential sampling positions, the first sampling pattern having sample locations in the first and fourth rows of the array and the second sampling pattern having sample locations in the second and third rows of the array.

However, Sato further discloses the claimed limitation that all sampling patterns are considered as dividing the regions of respective pixels into the same four-by-four array of sub-regions and four potential sample positions are arranged within the array in a manner whereby no two potential sample positions are located in the same row, column, or diagonal of sub-regions, the plurality of sampling patterns comprising first and second sampling patterns, each defining

two sampling positions from the four potential sampling positions, the first sampling pattern having sample locations in the first and fourth rows of the array and the second sampling pattern having sample locations in the second and third rows of the array (*the first axis is the x-axis and the second axis is the y-axis. Samples are distributed on the two regions separated by the middle line of the 4 by 4 sub-pixel matrix parallel to the x-axis and the middle line. Samples are also distributed on the two regions separated by the middle line of the 4 by 4 sub-pixel matrix parallel to the y-axis; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 21:

The claim 21 encompasses the same scope of invention as that of claim 14 except additional claimed limitation of the sampling pattern alternating per pixel along at least one row or column of pixels. However, Sato further discloses the claimed limitation of the sampling pattern alternating per pixel along at least one row or column of pixels (*Sato discloses the sampling patterns alternating for adjacent pixels along a row or column of pixels in an image; see Figs. 26, 29, 34, 36, and 38; col. 2, 4, 8, 11-12; 13-14*).

Claim 32:

The claim 32 is subject to the same rationale of rejection set forth in the claim 1.

Claims 86 and 88:

The claim 86 encompasses the same scope of invention as set forth in claim 1 except additional claimed limitation of sampling at only two sample locations relative to a pixel in accordance with a sampling pattern and an apparatus for rendering of an image. However, Sato and Leather further disclose the claimed limitation of sampling at only two sample locations

relative to a pixel in accordance with a sampling pattern and alternating along the y-axis (*e.g., Sato Fig. 32 and Leather Fig. 9*) and an apparatus for rendering of an image (*see Sato Figs. 2-22 and Leather Fig. 9*). The claim 88 is subject to the same rationale of rejection set forth in the claim 86.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (571) 272-7665. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jcw